

REMARKS:

In the foregoing Listing of Claims, Applicants insert the limitations of claim 2 into claim 1. Applicants cancel claim 2. Claim 1 remains in the application for consideration by the Examiner. Applicants respectfully request reconsideration and allowance of claim 1 for reasons that follow.

Applicants respectfully request that the foregoing amendments be entered under the provisions of 37 C.F.R. §1.116(b), because they simplify issues for appeal. The foregoing amendments simply insert limitations from a dependent claim into an independent claim and do not raise any new issues, and therefore, reduce issues for appeal.

The Office Action rejected claims 1 and 2 under 35 U.S.C. §103(a) as being unpatentable over Xie (US 6,503,620 B1) and Shields (US 5,609,938). The Office Action stated that Xie at column 26, lines 51-54 and column 28, Table X discloses a pressure-sensitive adhesive sheet wherein the adhesive layer has a storage modulus and a loss tangent within the presently claimed range. The Office Action acknowledged that Xie fails to disclose a pressure-sensitive adhesive layer having formed therein a plurality of through holes passing through from one surface to the other surface thereof, being liable to be subjected to a pressure of not less than 1 Pa, the pressure-sensitive adhesive sheet characterized in that said through holes

having a diameter in the base material and the pressure-sensitive adhesive layer the range of 0.1 to 150 μm , and a hole density in the range of 30 to 50,000 per/ cm^2 .

The Office Action cited the teachings of Shields as teaching a pressure-sensitive adhesive layer having formed therein a plurality of through holes passing through from one surface to the other surface thereof (col. 7, ll. 19-22), and being liable to be subjected to a pressure of not less than 1 Pa (Fig. 2a, wherein the pressure is applied during attachment); the through holes having a diameter in the base material and the pressure-sensitive adhesive layer in the range of 25.4 to 150 μm and a hole density in the range of 31 to 62 per/ cm^2 (col. 7, ll. 19-22) for the purpose of allowing light transmission through the adhesive assembly (col. 3, ll. 24-26). Applicants respectfully traverse this rejection of claim 1 over the combined teachings of Xie and Shields.

The Office Action acknowledged that the teachings of Xie and Shields do not disclose or suggest that the holes are formed by laser processing, as now required in claim 1. The Office Action stated that this is a product-by-process limitation, and the presently claimed product does not require this method step, only the structure implied by laser processing. The Office Action continued that the recited laser processing step of present claim 1 implies a structure of a substrate with a hole through the surface, allegedly as discussed at column 7, lines 19-22 of

Shields. Applicants respectfully submit that this characterization of the presently claimed invention and the teachings of Shields cannot be correct.

In particular, Applicants respectfully submit that the limitation that the through holes are formed by laser processing implies or results in a structure in the presently claimed invention that is not contemplated or suggested by the teachings of Xie and Shields. Namely, the surface of the presently claimed pressure-sensitive adhesive sheet is smooth and blemish free where the through holes appear without marring around or about the through holes. On the other hand, when through holes are formed by punching in accordance with the prior art of Shields, a concave surface is formed around the hole die insertion side and a protrusion or raised surface is formed around the hole at the die protrusion side. Applicants respectfully submit that the limitation in claim 1 that defines that the through holes are formed by laser processing defines a structure in the presently claimed invention that is different and patently distinguishable from the panel proposed by Shields alone or combined with Xie, namely, a smooth surface as opposed to a blemished or marred surface.

While the teachings of Shields are completely silent with respect to how the holes are formed therein, one of ordinary skill in the art would expect or understand that the holes in the teachings of Shields are punch-pressed. Shields proposes a one-way vision display panel assembly specially constructed for

pressure sensitive application onto a window, which has through holes. The holes in this type of panel are typically formed by punch-pressing. Applicants attach hereto a copy of Japanese laid-open publication No. 08-030196 (Matsukura) for the Examiner's consideration. Matsukura discloses a sticker having an inner side that is barely visible but at least visible from the outer site, while an outer side of the sticker is easily visible from the inner side. The technical field of the sticker of Matsukura is the same as the technical field of the one-way vision display panel assembly of Shields. Accordingly, one of ordinary skill in the art would understand and expect that the panel proposed by Shields is made in the same manner as that of Matsukura.

Matsukura describes that "Many bores 7 are formed by means like a punch press." (¶ 0012). The through holes in Shields are also formed by a punch press. When a punch press is used for forming through holes, a concave surface is formed around the hole die insertion side, and a protrusion or raised surface is formed around the hole at the die protrusion side. These imperfections on the surfaces adjacent the through holes are conspicuous on the front face of the pressure-sensitive adhesive sheet, and hence the appearance of the pressure-sensitive adhesive sheet is marred.

On the other hand, when laser processing is used as presently claimed, there are no concave surfaces and protruding or raised surfaces formed about the through

holes. Accordingly, in the pressure-sensitive adhesive sheet having through holes formed by laser processing, as presently claimed, the through holes are not conspicuous or visible on the front surface of the pressure-sensitive adhesive sheet, and hence the appearance of the pressure-sensitive adhesive sheet is not marred (Spec. p. 5, ll. 14-16). This is one advantage of the structure of the presently claimed invention.

From the above, it is readily apparent that the structure of holes made by laser processing is different from the structure of holes made by punch pressing. Since neither Shields nor Xie contemplate or suggest forming through holes by laser processing, as presently claimed, these teachings cannot contemplate or suggest a pressure-sensitive adhesive sheet having through holes made by laser processing and the resulting smooth surface structure as required in the present claims.

The laser processing required in the presently claimed invention provides a structural difference and advantage to the presently claimed invention in addition to a smooth surface as opposed to a blemished or marred surface in accordance with Shields, which was discussed above. Namely, the laser processing in the presently claimed invention provides a pressure-sensitive adhesive sheet necessarily having a smaller open area when compared to a panel formed by punch pressing, such as in the prior art of Shields.

In other words, when through holes are formed by a punch press, the percentage of the open area is necessarily higher than when the through holes are formed by laser processing. Shields explains that the open area of the panels therein is about 50% to 70% (col. 5, ll. 1-4; col. 7, ll. 29-32). Shields explains that the open area of the prior art is about 37% (col. 2, ll. 43-53; col. 5, ll. 1-4; col. 7, ll. 29-32). On the other hand, when the through holes are formed by laser processing as in the presently claimed invention, the open area is about 9% at a maximum, which is calculated by the following formula.

Maximum diameter: 150 μm (radius: 0.075 mm)
maximum hole density: 50,000 per 100 cm^2 (per 10,000 mm^2)
open area (%) = $[\{(0.075)^2 \times 3.14 \times 50,000\} / 10,000] \times 100 \approx 8.83\%$

Note that, according to Example 1 in the present specification, the open area is about 0.012%, which is based on the following calculation.

Diameter: 25 μm (radius: 0.0125 mm)
hole density: 2500 per 100 cm^2 (per 10,000 mm^2)
open area (%) = $[\{(0.0125)^2 \times 3.14 \times 2500\} / 10,000] \times 100 \approx 0.012\%$

Applicants respectfully submit that the laser processing in the presently claimed invention provides a pressure-sensitive adhesive sheet necessarily having a smaller open area when compared to a panel form by punch pressing, such as in Shields, for the reasons discussed above. Since neither Shields nor Xie

contemplate or suggest forming through holes by laser processing, as presently claimed, these teachings cannot contemplate or suggest a pressure-sensitive adhesive sheet having the structure (i.e., very small open area) of the presently claimed invention, which results from laser processing.

For at least the foregoing reasons, Applicants respectfully submit that the presently claimed invention is patently distinguishable from the teachings of Shields and Xie. Therefore, the presently claimed invention cannot be obvious over the combination of Xie and Shields, and Applicants respectfully request that the Examiner reconsider and withdraw this rejection.

As explained in Applicants' previous amendment, the data in the Specification show and illustrate the unobviousness of the presently claimed invention. While applicants discussed this data in the Amendment filed on December 31, 2009, the outstanding Office Action does not comment thereon. The examples in the Specification demonstrate an important and unexpected relationship between the size of the presently claimed through holes and the presently claimed storage modulus and loss tangent of the pressure-sensitive adhesive layer. Neither Xie nor Shields contemplate or recognize the importance and significance of these limitations in the presently claimed invention. Consider, for example, Examples 1-6 and Comparative Examples 1 and 2, and Table 1 on pages 20-25 in the Specification. When through holes are formed in materials

having a storage modulus or loss tangent outside the presently claimed range, the through hole diameter after hot pressing is nearly or almost all lost. More importantly, the air entrapment removability of the resulting pressure-sensitive adhesive sheets is significantly diminished. On the other hand, when through holes are formed in materials having a storage modulus or loss tangent within the presently claimed range, the through hole diameter after hot pressing is maintained. Furthermore, the air entrapment removability of the resulting pressure-sensitive adhesive sheets according to Applicants' claimed invention is excellent.

In addition, the data in Table 1 on page 25 of the Specification demonstrates that pressure-sensitive adhesive sheets having through holes formed therein for which the pressure-sensitive adhesive layer has a storage modulus and a loss tangent, as presently claimed, easily eliminate air entrapment. This remarkable air entrapment removability of the presently claimed invention (Examples 1-6) is unexpectedly superior to that of Comparative Examples 1 and 2, which correspond to the prior art.

At least for these reasons, Applicants respectfully submit that claim 1 is patently distinguishable from the teachings of Xie and Shields within the meaning of 35 U.S.C. §103. Therefore, Applicants respectfully request that the Examiner reconsider and withdraw the rejection set forth in the outstanding Office Action over the teachings of Xie and Shields.

In view of the foregoing, Applicants respectfully submit that this application is in condition for allowance and request a timely notice to this effect. If questions relating to patentability remain, Applicants invite the Examiner to contact the undersigned by telephone.

Please charge any unforeseen fees that may be due to Deposit Account No. 50-1147.

Respectfully submitted,

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Attachment: Japanese laid-open publication No. 08-030196 (Matsukura)

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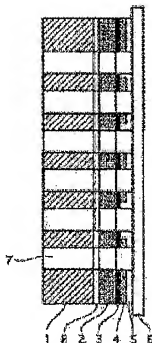
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(54) SEE-THROUGH STICKER AND ITS PRODUCTION

(57)Abstract:

PURPOSE: To provide a sticker which make the inner side hardly visible but at least visible from the outer side and makes the outer side visible well from the inner side and is capable of expressing bright and impressive patterns by providing this sticker with many through-holes penetrating a base plate, solid printing and pattern printing.

CONSTITUTION: This sticker is produced by subjecting one surface of the base plate 1 consisting of a plastic film colored to a dark color to solid printing 2 with hiding ink, subjecting the surface thereof to solid printing 3 and pattern printing 4 of bright color ink to form the patterns, providing the base plate with the through-holes 7 over the entire part, applying an adhesive or tacky adhesive 5 on the printed surface and pressing a release film 6 thereon. Many through-holes 7 are formed by means, such as punching press. The sizes and arrangement of the through-holes 7 are arbitrary and the regular arrangement of circular holes of proper diameters suffices. The patterns are not impaired and favorable results are obtained, in terms of ease of seeing-through if many holes of small diameters are formed. The range of 10 to 50% is adequate as the area ratio of the through holes 7 from the viewpoint of the harmony of the light shieldability with the see-through property.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application]This invention relates to the sticker which can be seen through, especially the sticker used sticking on the window of a car.

[0002]

[Description of the Prior Art]Although outside can be seen out of a building. In order to make it not seen [inside] from outside easily, What provided many bores in piles (JP,54-93255,U) is known by what applied the reflexivity substance to one side of a substrate sheet, and provided the countless bore (JP,51-86049,U), and the plastic sheet of the dark color [inner layer] in aluminum foil etc.

[0003]If the area rate in which a bore generally occupies fluoroscopy by many bores in the shielding sheet made possible is large, fluoroscopy nature is high, and if small, naturally a light blocking effect is high. However, the fluoroscopy nature from the outside with it to the inside does not have few things to make low, either. [high fluoroscopy nature from the inside to the outside and] [opposite] In order to fill this hope, there is a proposal that what is necessary is just to punch the aperture of a bore and the relation of a pitch tidily by ***** at the range of 0.8-2.0 mm (JP,55-57802,A). As a means to stick this shielding sheet on a window, it is a double faced adhesive tape and sticking on a border is only taught. However, it is not suitable for sticking on the window of a car, and generally, when it removes, such how to stick has the tendency for a binder to remain, and is not preferred [a double faced adhesive tape].

[0004]Since using for advertisement or a certain display is main as for the sticker stuck on the window of a car, the pattern which is outside is a problem.

They are clear, it is called for that it is what charms eyes and, on the other hand, the inside has that a pattern is [much] unnecessary.

Although the inside is moreover often wanted from the outside to be unable to be not much clearly seen, it is not allowed to use invisibility. Light must not be reflected and it sticks to a window extensively, and weatherability is high and, moreover, the conditions that a stick substitute must be easy etc. are imposed.

[0005]

[Problem(s) to be Solved by the Invention]In the sticker which makes it the main uses for the purpose of this invention to harmonize many above demands, and to stick it on the window of a car, Although the inside cannot be not much clearly seen from the outside, it is not invisible, and from the inside, the outside can be clearly seen, And a pattern clear and impressive as well as the outside not being light reflex nature can be expressed, and it sticks extensively, and weatherability is high and also there is a stick substitute in the sticker made easily and providing the manufacturing method.

[0006]

[Means for Solving the Problem]The first mode of a sticker which can see through this invention, A layer of the solid printing 2 of the substrate 1 which consists of a film of a plastic colored a dark color as shown in drawing 1 and drawing 2, and concealment nature ink, A layer of the solid printing 3 of ink of light color, a printing layer of a character or a pattern by the pattern printing 4 of ink of light color, It is a sticker which laminates the layer 5 and the mold releasing film 6 of adhesives or a binder in this order, and has the bore 7 of a large number which pierce through each class of the substrate 1, the solid printings 2 and 3, and the pattern printing 4 at least,

which is stuck and used for a transparent sheet like body and which can be seen through.

[0007]A manufacturing method of this sticker performs solid printing 2 to one field of the substrate 1 which consists of a film of a plastic colored a dark color in concealment nature ink, it consists of performing the solid printing 3 and the pattern printing 4 of ink of light color on it, providing a pattern, forming many bores 7 in the whole, applying adhesives or the binder 5 to a printing surface, and applying the mold releasing film 6.

[0008]In a typical example of the above-mentioned mode, polyester film colored black is used as the substrate 1, business of the white ink is carried out, solid printing 2 of concealment nature ink is performed, and combination of the solid printing 3 in red ink and the pattern printing 4 in golden ink performs a character and a pattern. If there is necessity when performing solid printing 2 of white ink, it is good to form the proper primer layer 8 on the base film 1.

[0009]The second mode of a sticker which can see through this invention, The substrate 1 which consists of a film of a plastic colored a dark color as shown in drawing 3, a printing layer of a character or a pattern by the pattern printing 4 of ink of light color, It is a sticker which laminates the layer 5 and the mold releasing film 6 of adhesives or a binder in this order, and has the bore 7 of a large number which pierce through each class of the substrate 1 and the pattern printing 4 at least, which is stuck and used for a transparent sheet like body and which can be seen through.

[0010]A manufacturing method of this sticker consists of performing pattern printing 4 of ink of light color to one field of the substrate 1 which consists of a film of a plastic colored a dark color, providing a character and a pattern in it, forming many bores 7 in the whole, applying adhesives or the binder 5 to the surface, and applying the mold releasing film 6.

[0011]Since weatherability is required, ink used for printing is good to use what added strong paints which are mainly concerned with colorless paints to a binder of vinyl-chloride-acetate copolymerization resin or an acrylic resin system.

[0012]Many bores 7 are formed by a means like a punch press. A size of a bore and arrangement are arbitrary, for example, should just arrange a circular hole of a proper diameter regularly according to the known art. A direction which makes a thing of a byway a large number is preferred at a point which does not spoil a pattern and is easy to see through. As an area rate of a bore, in view of harmony of the fluoroscopy nature and light blocking effect, 10 to 50% of range is suitable, and a desirable range is 25 to 40%.

[0013]a binder or adhesives -- arbitrary -- ***** -- although things are made, a desirable example is a binder of an aqueous acrylic emulsion type, this type of adhesives receive sticker material after punching -- a hole -- there is an advantage of not remaining after it is easy inside to avoid and apply beginning to see, and being easy to stick a sticker and removing.

[0014]What is necessary is to give a rounded wheel part doubled with shape of a window frame in many cases, and just to perform mold omission processing, where a mold releasing film is applied in that case if this sticker is stuck, for example on the rear window upper part of a car.

[0015]Although a release paper of daily use which applied polyolefin resin to paper may be sufficient as the mold releasing film 6, before a direction of a bright film removes a mold releasing film, a character and a pattern can be seen, and it is preferred. A high transparent polypropylene film and polyester film are preferred.

[0016]

[Function]In use of the sticker of this invention, it is needless to say, and the mold releasing film 6 is exfoliated, the field of adhesives or a binder is taken out, and this is stuck on a window. Although the outside looks good from the inside of the sticker stuck on the window, in order for the inside not to look not much good from the outside and not to make the outside into reflexivity moreover, the inside is made into a dark color and light color makes the outside **. Since those who see from outside will receive comparatively a lot of lights if the outside is made into light color, the light from the inside which comes out through a bore will become weak relatively, and an inside will not look the area rate of a bore almost by ***** high, either. Since it is a dark color, the light from the field of a sticker is slight to this from the inside, and reverse, and becomes them only with the light from the outside which enters through a bore. If it does in this way, since the area rate of a bore can be taken high, fluoroscopy nature which looks at the outside from the inside can be made high.

[0017]The outside of this sticker is a ***** thing about a character or a pattern in which skillful ink in the back of light color with the first golden mode.

the second mode is a ***** thing about a character or a pattern in the pattern printing of light color at the dark-colored back -- the area rate of a bore -- the suitable range -- ***** -- by things, it can be considered as the pattern which both pulls attention, and the purpose of sticker use can be attained.

[0018]

[Example]After using the film with a thickness of 75 micrometers of polyester (polyethylene terephthalate) colored black as the substrate and applying the primer to the surface, the white ink which added the titanium white to the acrylic resin binder performed solid printing, and it was considered as the concealing layer. After performing solid printing of red ink, and pattern printing of golden ink from moreover, the bore which has arranged a circular hole 1.0 mm in diameter alternately was provided (38% of area rate of a bore).

[0019]On the printing surface, the binder of the aqueosity acrylic emulsion type was applied and the high transparent polypropylene film was applied as a mold releasing film. It pierced in the long and slender sea cucumber type shape where this raw material was set by the shape of the upper part of the rear window frame of a car to stick, and the upper limb carried out the bend gently and where the margo inferior was linear and the angle of both the right and left ends was taken, and the sticker which can see through this invention was obtained.

[0020]

[Effect of the Invention]When it is used having stuck on the window of the car, the sticker which can see through this invention can have the seldom seen inside, if it sees from the outside, and the character and pattern which consist of combination of skillful color look impressively. The outside can be clearly seen and does not become the hindrance of operation from the inside. a binder -- suitable -- ***** -- by things, attachment and a stick substitute are easy and a binder does not remain in glass.

[Translation done.]